

### **REMARKS**

The following items in the Office Action are acknowledged.

1. Examiner acknowledges that parent USPN 5,656,186 was previously surrendered in application 09/366,685.
2. The terminal disclaimer of January 29, 2003 is proper and obviates the prior double patenting rejection.
3. Applicants' declarations under 37 CFR 1.131 have overcome the Kautek et al. reference.
4. Applicants' arguments regarding the rejection under 35 U.S.C. 251 on the basis of recapture have overcome the rejection.

The following requirement will be met once claims under rejection are allowed.

1. Supplemental reissue oath/declaration will be submitted to overcome rejection of claims 46-80 under 35 U.S.C. 251.

### **REJECTION OF CLAIMS UNDER 35 U.S.C. 112**

Claim 52 is rejected under 35 U.S.C. 112, first paragraph on the basis that it contains subject matter not described in the specification, and more specifically on the basis that USPN 5,656,186 does not support the machined material being a semi-conductor.

It should be noted that a similar rejection was made in the reissue application, and such rejection was withdrawn. Such withdrawal was at least on the basis of a

personal interview with the Examiner which occurred on October 19, 2000 and included expert Dr. Peter Pronko. A follow-up Affidavit of Dr. Peter Pronko was filed November 1, 2000, a copy of which is being submitted herewith.

Specifically, in the present Office Action, it is stated that Applicants could not have contemplated the genus of all materials inclusive of semi-conductors.

Pursuant to the evidence provided and supported to overcome this rejection in the reissue application, Applicants submit the following support based upon, and in addition to, the aforesaid Affidavit of Dr. Pronko.

Under 35 U.S.C. 112, first paragraph the patent specification must contain a written description of the invention sufficient to allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed. In re Gosteli, 872 F.2d 1008, 10 U.S.P.Q.2d 1614 (Fed.Cir. 1989). Hand in hand with this principle is the well established related principle that a patent owner may assert claims which go beyond the specific embodiment shown in his application. Ethicon Endo-Surgery, Inc. v. United States Surgical Corp. 93 F.3d. 1572 n.7, 40 U.S.P.Q.2d 1019 (Fed. Cir. 1996). In Ethicon, the Court of Appeals for the Federal Circuit analyzed a similar issue:

Claim 1 was properly rejected because it *recited* an element not supported by Fox's disclosure, i.e. a lockout "on the stapler." It does not follow, however that Fox's disclosure could not support claims sufficiently broad to read on a lockout off the cartridge, *See e.g., In re Vickers*, 141 F.2d. 522, 525, 61 U.S.P.Q. 122, 125 (C.C.P.A. 1944) ("an applicant ... is generally allowed claims when the art permits, *which cover more than the specific embodiment shown.*") If Fox did not consider the precise location

of the lockout to be an element of his invention he was free to draft claim 24 broadly (within the limits imposed by the prior art) to exclude the lockout's exact location as a limitation of the claimed invention. See 35 U.S.C. § 112.

See Ethicon, Footnote 7, (emphasis in original)

Applicants' claims as submitted in the original parent and reissue filings encompassed the application of the method to all materials. This was supported by testing performed on numerous different materials set forth in the specification of the parent and reissue applications. Applicants characterized these materials broadly to cover all materials, namely OPAQUE, TRANSPARENT and TISSUE.

Like Fox, the Applicants did not consider the precise material to which the inventive method applied to be an element of the invention. Thus, the claims excluded a limitation to the specific material. The claims as originally issued in the parent, were directed to **all materials**.

As is evident from the attached Affidavit of Dr. Peter Pronko submitted on November 1, 2002, under 37 C.F.R. 1.132, the examples of opaque materials and transparent materials define the optical boundary conditions for all materials including non-biologic, non-organic, and semi-conductors. A person of ordinary skill in the art would appreciate that the optical properties of semi-conductors fall between the optical properties for opaque and transparent materials. One example of optical properties is absorption coefficient. The absorption coefficient of semi-conductors are somewhere between opaque materials such as gold and transparent materials such as crystal. Another optical property is an optical band gap. The optical band gap of semi-

conductors is between a transparent material such as boric nitride and an opaque material such as tin. In light of the factual support provided by Dr. Pronko, Applicants submit that Examiner's § 112 rejection is contrary to Ethicon.

Applicants are not prohibited from setting forth claims "*which cover more than the specific embodiment(s) shown.*" Ethicon supra. The precise material to which Applicants' inventive method applies is not considered an element of the invention. Applicants' recitation of semi-conductor material in claim 52 is supported by numerous examples in the specification. See Pronko Affidavit attached hereto.

Based on the above arguments and affidavit support, Applicants request the rejection be reconsidered and withdrawn.

#### **REJECTION OF CLAIMS UNDER 35 U.S.C. 102(b)**

Claims 46, 48, 49, 50, 51/46, 51/48, 51/49, 51/50, 52/46, 52/48, 52/49, 52/50, 55/46, 55/48, 55/49, 55/50, 57/46, 57/48, 57/49, 57/50, 58/46, 58/48, 58/49, 58/50, 61/56/46, 61/56/48, 61/56/49, 61/56/50, 62/55/46, 62/55/48, 62/55/49, 62/55/50, 63/46, 63/48, 63/49, 63/50, 69/46, 69/48, 69/49, 69/50, 70/46, 70/48, 70/49, 70/50, 71/46, 71/48, 71/49, 71/50, 72/46, 72/48, 72/49, 72/50, 73/46, 73/48, 73/49, 73/50, and 78 are rejected under 35 U.S.C. 102(b) as being anticipated by Ihlemann et al. The basis of the rejection is essentially that since Ihlemann et al. discloses a short pulse, "inherently under Applicants' discovered law of nature (the log-log relationship between fluence threshold at which breakdown occurs versus laser pulse width, the relationship exhibiting a distinct change in slope with respect to decreasing pulse width to a nearly

constant value) the laser pulse ablation of Ihlemann et al. must also be subject to the same law of nature”.

This rejection is not supportable for several reasons. First, the rejection assumes that the fluence/pulse width relationship with respect to decreasing pulse width (pw) is to a nearly constant value. This is not in accord with the data as shown particularly in Figures 3, 8 and 9 of the present application. It is important to note that below a certain limit, the curve experiences an upturn from the square root of T curve, and that the damage threshold becomes deterministic or essentially accurate.

The second assumption is that Ihlemann must be operating in accordance with the same relationship. This assumption is not correct. Ihlemann in the abstract states that the key relationships are based on a range of wavelengths, a range of pulse durations, and a range of surface qualities of the materials. Ihlemann states that these three parameters are key to performance of ablation. See Ihlemann abstract: “The performance of the ablation is found to depend not only on wavelength and pulse duration but also on the existing or laser induced surface quality (e.g., roughness) of the material”. See Ihlemann Figure 1--ablation rates at different wavelengths, pulse durations and rough and polished surfaces.

It is clear from Ihlemann that the relationship between fluence and pulse width is not recognized. Ihlemann, insofar as the short pulse is concerned, provides only one value, namely pulse width, and does not provide a relationship between pulse width and fluence at such short pulse.

In summary, Ihlemann does not recognize a relationship between fluence breakdown threshold and pulse width having a distinct change slope, since Ihlemann does not even recognize a relationship between fluence and pulse width.

The Office Action cites EMI Group North America Inc. v. Cypress Semiconductor Corp. for the proposition that recitation of a law of nature does not distinguish a claim from prior art. This authority is not pertinent to present claims and applied art.

In EMI the fuse structure of the invention and the fuse structure of the applied references was deemed to be the same. The issue was whether such fuses would each have the same failure mode since their structures were each the same. Here, a law of nature being the mechanism for fuse failure was deemed inherent because the structures were the same.

In the present application, the claims include the limitation of pulses “characterized by a pulse width with a relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.”

Independent claims 46, 48, 49, 50, and the rejected dependent claims which depend therefrom, along with independent claim 78, all contain this specific feature not present in Ihlemann. Clearly Ihlemann is not at all concerned about a relationship between fluence and pulse width. Ihlemann is only concerned about performance of ablation dependent on wavelength, pulse duration and surface roughness. Therefore, the rejection for anticipation on Ihlemann is unsupportable.

Claims 46, 48-50, 51/46, 51/48, 51/49, 51/50, 52/46, 52/48, 52/49, 52/50, 55/46, 55/48, 55/49, 55/50, 57/46, 57/48, 57/49, 57/50, 58/57/46, 58/57/48, 58/57/49, 58/57/50, 62/46, 62/48, 62/49, 62/50, 63/46, 63/48, 63/49, 63/50, 65/46, 65/48, 65/49, 65/50,

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Alexander suffers from the same deficiencies as Ihlemann, namely, that the stated relationship and change in slope is nowhere suggested. Like Ihlemann, Alexander at best presents one data point for pulse width. Like Ihlemann, Alexander does not provide pulse width in relationship to fluence, let alone three different data points of pulse width versus fluence to define a change in slope. Instead, Alexander states that in carrying out his invention any short pulse laser with high energies greater than a desired material removal threshold is adequate. Alexander merely concludes that depth is a function of the complex optical properties of the material and the laser wavelength. (See Col. 9, lines 50-62.) For these reasons and for the reasons further described earlier with respect to Ihlemann, Alexander does not anticipate the claims of Applicants invention.

Claims 47, 51/47, 52/47, 55/47, 56, 59, 60, 61, 58/47, 62/55/47, 63/47, 65/47, 66/47, 69/47, 70/47, 71/47, 72/47, 73/47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Lai USPN 5,984,916.

Ihlemann is applied as stated earlier and Lai is described in the Office Action as showing an interaction zone smaller than the wavelength of the laser beam.

Clearly Lai does not supply the deficiencies of Ihlemann since Lai does not set forth the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

In addition, Figure 5 viewed in light of Lai column 8 does not suggest an interaction zone smaller than the laser wavelength. Note that the wavelength ranges are very broad, and several are mentioned, namely 400nm to 1900nm, 2.1 to 2.8  $\mu\text{m}$ , and larger than 3.1  $\mu\text{m}$ . No wavelength is selected related to the exemplary 10  $\mu\text{m}$  diameter interaction point.

As can be seen, Lai does not teach an interaction point dimension smaller than wavelength.

Finally, Lai is directed to tissue and Ihlemann is directed to fused silica. One skilled in the art would not be motivated to combine Ihlemann and Lai due to the different materials. Only by hindsight, with the benefit of the present invention, is one able to arrive at such combination.

Claims 64/46, 64/48, 64/49, and 64/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Mourou et al. USPN 5,235,606. Ihlemann is applied as described earlier and Mourou is described to teach the



generating of a short optical pulse by stretching, amplifying and recompressing the pulse.

Mourou does not supply the deficiencies of Ihlemann since Mourou does not show, teach or suggest the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claim 64/47 was rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann in view of Lai as applied earlier and further in view of Mourou as applied earlier.

Claim 64/47 is submitted to be patentable over the aforesaid combination for the reasons given above with regard to Ihlemann, Lai and Mourou alone and in combination.

Claims 65/46, 65/48, 65/49, 65/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Stuke et al. USPN 5,243,589, with Ihlemann as being applied above and Stuke cited to show machining with femtosecond pulses by scanning.

Clearly Stuke does not supply the deficiencies of Ihlemann since Stuke does not set forth the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claims 47, 51/47, 52/47, 55/47, 56, 57/47, 57/47, 58/47, 59, 60, 61, 62/47, 63/47, 65/47, 66, 68/47, 69/47, 70/47, 71/47, 72/47, 73/47 are rejected under U.S.C. 103(a) as being unpatentable over Alexander as applied earlier and in view of Lai as applied earlier.

Clearly Lai does not supply the deficiencies of Alexander since Lai does not set forth the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claim 64/46, 64/48, 64/49, and 64/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Mourou et al., both as applied earlier.

Mourou does not supply the deficiencies of Alexander since Mourou does not show, teach or suggest the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claim 64/47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Lai as applied earlier.

Clearly Lai does not supply the deficiencies of Alexander since Lai does not set forth the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claims 53/52/46, 53/52/48, 53/53/49, 53/52/50, 54/53/52/46, 54/53/52/48, 54/53/52/49, 54/53/52/50, 79 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Wojnarowski et al. USPN 5,104,480. Alexander is as applied above and Wojnarowski is cited for teaching machining of gold to create a conductive pattern for an integrated circuit.

Wojnarowski does not supply the deficiencies of Alexander since Wojnarowski does not show, teach or suggest the relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope.

Claims 53/52/47, 54/53/52/47, 68/47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Lai and further in view of Wojnarowski each of the aforesaid references as applied earlier.

Claims 53/52/47, 54/53/52/47, 68/47 are submitted to be patentable over the aforesaid combination for the reasons given above with regard to Alexander, Lai and Wojnarowski alone and in combination.

**ACKNOWLEDGEMENT OF CLAIMS PATENTABLE OVER THE ART OF RECORD**

Claims 67 and 74-77 are stated in the Office Action to patentably define over the art of record but are rejected under 35 U.S.C. 251 only because of the requirement for a supplemental oath/declaration.


Applicants acknowledge with thanks the patentability of such claims and respectfully submit that all of the claims of record are patentable over the art of record for the reasons given herein.

### CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this response is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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